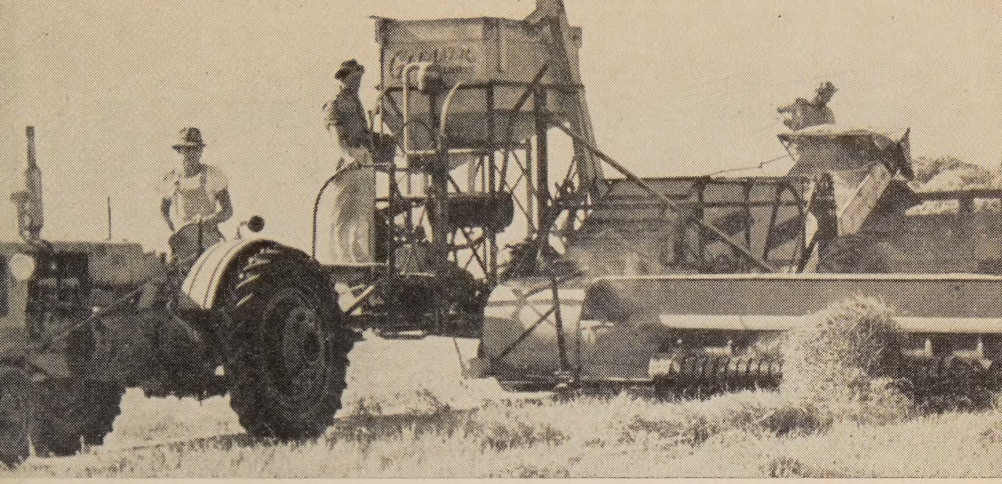

Methods of determining rental and custom work rates for machines such as these, and for other smaller farm equipment, are shown in this circular.

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By

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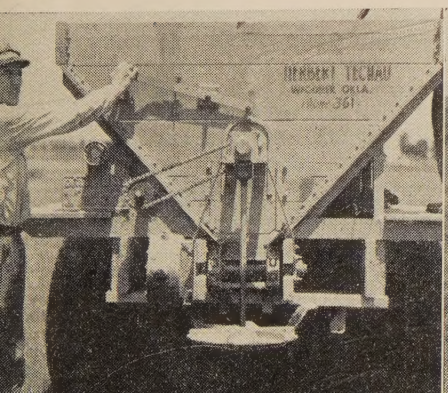

Determining Rates for Machine Rent and Custom Work

By E. A. TUCKER and PETER NELSON
Department of Agricultural Economics

What is meant by renting a machine should be immediately clear. Yet even this simple practice involves several variations including (a) renting a machine for cash, (b) exchanging the use of a machine for labor, or (c) exchanging the use of one machine for the use of another machine. "Custom work" refers to the practice of furnishing a machine, fuel, oil, and operator to neighboring farmers on a piece rate or day basis.

A fair rate for machinery rental on farms is dependent upon two things: first, the total cost of the service rendered by the machine; and second, the amount of use which can be expected from a particular piece of equipment during its lifetime. To derive a "custom rate," wages for labor and materials furnished must be added to the machinery rental figure. Stated in mathematical fashion, the machine rental rate per day would appear thus:

Total cost ÷ total use (in days) = rate per day.

Rate per acre could be determined by substituting total use in acres for total use in days. In this equation total cost is made up of:

(1) Interest on the average amount invested in the machine at the current rate charged for such loans. (Average amount invested is original cost plus trade-in or junk value divided by two, or original cost divided by two if no junk or trade-in value will remain when the machine has been worn out.)

(2) Annual repair costs.

(3) Taxes.

(4) Such other charges as insurance and shelter if they are applicable.

(5) Depreciation. Items 1, 2, 3, and 4 are added and then multiplied by the estimated life of the machine in years. To this is added No. 5, total depreciation of the machine—that is, original cost less the estimated junk or trade-in value when the machine is to be disposed of. Total use may be stated in days, hours, or acres per year multiplied by the number of years

which the machine will be used. Rate will, of course, be in the same kind of unit as used for indicating total use, as will readily be clear from the following problems.

PROBLEM I.

COST PER DAY FOR TRACTOR

In figuring the rates for a $1200 tractor which will be used for an average of 120 days per year and which will have a trade-in value of $200 after nine years, the following tabulation indicates how a fair rate of charge per day would be determined:

A. Rental Rate.		
(1) Interest on the average investment (original cost plus trade-in value, divided by two, at percent)	$35.00*	
(2) Estimated annual repairs	90.00	
(3) Taxes	6.00	
(4) Insurance	10.00	
Annual cost other than depreciation		$141.00
Total cost other than depreciation ($141 × 9 Years)	$1269	
(5) Depreciation for 9 years' use (original cost $1200 less trade-in value $200)	1000	
(6) Total cost of owning tractor for 9 years		$2269.00
(7) Total use of machine in days (120 days per year for 9 years)	1080	
(8) Rental rate per day for tractor when renter furnishes his fuel, oil and labor ($2269 divided by 1080 days)		$2.10
B. Custom Rate.		
If fuel, oil and grease costing $2.50 per day and a man worth $4.00 per day are furnished with the tractor the following additions are necessary:		
(1) Fuel, oil and grease per day, $2.50 plus $2.10 rental rate	$4.60	
(2) Labor per day	4.00	
(3) Custom rate per day		$8.60
C. Rental and Custom Rate Per Acre Based on Life of Machine in Years.		
This same procedure can likewise be used to determine rate per acre. If 9 acres is a normal day's plowing, the details would be:		
(1) Rental rate per acre for tractor ($2.10 divided by 9 acres per day)	$0.23	

* This figure is approximately correct. Average annual interest charges on the actual annual investment computed after assuming a straight line depreciation at compound interest would be slightly greater. However, for practical purposes of this nature the method used above appears to be adequate.

(2) Cost of fuel and lubricants per acre ($2.50 divided by 9 acres per day)	0.28	
Labor per acre ($4.00 divided by 9 acres per day)	0.44	
(4) Custom rate per acre		$0.95

D. Rental and Custom Rates Per Acre Based on Life of Machine in Total Performance.

Another alternative is to estimate total life of the tractor in terms of acres plowed or equivalent and divide this figure into "Total cost of owning tractor," No. 6, Part A. To this will be added per acre costs for fuel, lubricants and labor. With an estimated life of 9 years during which work equivalent to plowing 10,000 acres of land would be done with this tractor, the following figures would be substituted in the above formula:

(1) Rental rate per acre for tractor alone $2269 divided by 10,000)	$0.23	
Fuel, oil and grease per acre	0.28	
Labor per acre	0.44	
(2) Custom rate	$0.95	

PROBLEM II.

COST PER DAY FOR PLOW

When a plow, binder, or other implement is furnished, a rate for it may also be figured in the same manner. In figuring the rate per day for a $120.00 plow used 30 days per year for 10 years and traded in for $20.00, the problem would be stated thus:

(1) Interest on average investment (original cost plus trade-in value divided by two, at 5 percent)	$ 3.50	
(2) Estimated annual repairs	12.00	
(3) Taxes	.60	
(4) Insurance	1.20	
Annual cost other than depreciation		$17.30
Total cost other than depriciation ($17.30 × 10 years)	$173.00	
(5) Depreciation for 10 year's use ($120 less $20)	100.00	
(6) Total cost of owning plow for 10 years		$273.00
(7) Total use of machine in days (30 days per year for 10 years)	300.00	
(8) Rental rate per day for plow $273 divided by 300 days)		$0.91

By using a rate of 9 acres per day, the above figures may be converted into a rate per acre figure of $0.10. (See Problem I, Part C.)

PROBLEM III.

AMOUNT OF ANNUAL USE AFFECTS RATE

Days used per year and total life in years for a particular machine are of considerable importance in determining costs per day. To illustrate, it may be assumed that the tractor referred to in Problem I was used only 40 days per year and that after 5 years of use it would be traded in for $400.00. This would, of course, reduce annual repair costs materially, but it would also increase total cost per day, as shown below:

A. Rental Rate.		
(1) Interest on average investment ($1200 plus $400 divided by two at 5 percent)	$40.00	
(2) Estimated annual repairs	40.00	
(3) Taxes	6.00	
(4) Insurance	10.00	
Annual cost other than depreciation		$96.00
Total cost other than depreciation ($96.00 × 5 years)	$480.00	
(5) Depreciation for 5 years' use ($1200 less $400)	800.00	
(6) Total cost of owning tractor for 5 years		$1280.00
(7) Total use of machine in days (40 days per year for 5 years)	200	
(8) Rental rate per day for tractor when renter furnishes his fuel, oil, and labor ($1280 divided by 200 days)	$6.40	
B. Custom Rate.		
(1) Fuel, oil and grease per day $2.50 plus $6.40 (rental rate per acre)	$8.90	
(2) Labor per day	4.00	
(3) Custom rate per day		$12.90

In this case, rental rate per acre for tractors would be $0.99 and custom rate $1.43, assuming 9 acres of plowing per day (See Problem I, Parts B and C). These problems, No. 1 and 3, illustrate how high costs per acre result from low annual and total use. They also raise the question "When is a machine rental or custom rate reasonable?"

Perhaps the most suitable way to determine reasonable rates is for a group of farmers to cooperate in a record-keeping project and thus find what reasonable standards of performance are. Table II (page 18) shows that on Garfield County farms for which records are available, average tractor life has been 7.7 years. Annual use has been 478 hours, which means that 3,681 hours of work has been secured per tractor during its life on a particular farm. Naturally the tractors were not completely worn out after 7.7 years of use. They were traded in and later sold to other farmers in the area.

In normal times, factors other than net cost per acre may be of considerable importance in determining if a machine is to be traded in or repaired and used for another season. Frequently the need for a different size or type of machine has seemed to justify a change. The appeal of new devices may help to sell a new machine. It may seem to be good business to replace a partially worn out machine which may fail at a critical time with a new one which will give more dependable service. Important as these items are, they are generally considered along with and not in lieu of costs when farmers are thinking of trading for new machines.

Some Circumstances Affecting Rental Rates

A comparison of the foregoing illustrations should suggest that a fair rental rate for machinery, like a fair price for a farm product, is a thing which is likely to change with variations in circumstances. For example, on some farms the risk of failure is unduly high unless certain critical work is done within a limited few days at a rather definite time. If the farmer finds it difficult to depend on renting the necessary equipment when he must have it, his problem becomes a choice between two alternatives: (1) he can risk loss of his crop while waiting to use another man's machine, or (2) buy a machine for his own use. When the second alternative is accepted, he may have a machine which he needs very badly when he needs it, but which is in use on his farm for only a few days in the year. While such a farmer's *operating* costs may be as low as those of his neighbors who utilize their machines for longer periods, his *fixed or overhead costs* will be higher per acre and per day. Any small rent that he can obtain above cost of fuel, oil, and similar operating charges for increased use of his machine will help reduce his fixed costs. If, therefore, opportunities to do custom work are strongly competitive he may find it advantageous to exclude interest, taxes, and depreciation not due to use in his determination of the rental rate he is willing to accept. This is especially true if the nature of the machine is such that it will rot in spots, rust away, or become quickly out of date. Thus the farmer may find himself in circumstances which justify rental rates for his machinery which are below his average acre costs.

It should be clear that depreciation may be divided into two parts: (1) that which results from use, and (2) that which occurs even if the machine remains idle. This second type of depreciation may be caused by time and weather, or may result from obsolescence. The steam tractor, header, and horse-powered feed grinder are examples of farm equipment which

has suffered heavily from this type of depreciation. With machines lasting upward of 20 years a few additional days use will not detract any appreciable amount from their years of usefulness. The owner of this type of machine can afford to rent it out even at a figure which does not include a payment for depreciation. But with equipment which will actually be worn out in a few years, such as a pickup truck in daily use, any custom rate must include depreciation resulting from use if the owner is to avoid suffering a loss due to "custom work." In a war emergency, custom rates should be placed, not at the point where the equipment owner can break even on his operation, but rather so that the one renting a machine will pay a toll for its use equal to its cost determined by some formula as in Problem I.

Importance of Insurance Item

The item "Insurance" is intended to cover both premiums paid and an allowance for the usual risks assumed by the machine owner. There is another type of risk which must be considered very carefully in determining a fair rate for machine rental. This risk fluctuates widely from season to season and is of such a nature that it can seldom be insured against. During slack seasons in normal times there is little chance that a machine operator's own crop will suffer because he does custom work. When this risk is at all evident it usually presents such a great hazard that custom work is out of the question. Shoud it be desirable to add a figure for this risk into the total charge, it had probably best be added to the per acre or per day figures shown here.

Local Conditions Affect Rate

Custom rates for a particular operation may show variation in different communities, or may fluctuate within a community for a particular year. Topography, size of field, texture of the soil, and the frequency of gullies, ditches, stumps or rocks which may decrease the daily performance or damage machinery should be taken into account in arriving at a fair rate. Table I shows some custom rates which have been used in particular counties during recent years.

Data gathered from Garfield County farmers showing average life of their machines, hours of use per year, and, for a few machines, annual repair costs are summarized in Table II. While these data cannot be used for all circumstances, they should prove a reasonable guide for those instances in which more appropriate information is not available. Probably the best guide is local experience.

TABLE I.—Custom Rates Charged in Selected Counties.[1]

	Garfield County	Muskogee County	Okfuskee County	Payne County
	(Dols. per A.)	(Dols. per A.)	(Dols. per A.)	(Dols. per A.)
Plowing	1.00 to 1.25	1.00 to 1.50	---	1.00 to 1.50
Drilling	0.25 to 0.50	0.40 to 0.50	0.40 to 0.50	---
Binding	0.75 to 1.00	1.00	1.00 to 1.25	1.00 to 1.25
Combining	1.50 to 2.00	---	2.00 to 2.25	1.25 to 2.50
Mowing	0.50 (Cents per bale)	0.40 to 0.60 (Cents per bale)	1.00 (Cents per bale)	(Cents per bale)
Baling	6 to 8	4 to 9	5 to 7	5 to 7
Threshing	(Cts. per bu.)	(Cts. per bu.)	(Cts. per bu.)	(Cts. per bu.)
Wheat	12	5 to 6	---	7
Oats	2 to 7	3	3 to 3.5	3
Barley	6 to 9	---	---	5
Sorghum	6 to 10	---	---	---

[1] Rates shown here are for tractor, fuel, other tools, and labor except for threshing. In most cases the crop owner furnished a part of the labor for threshing.

When costs or expected life have to be estimated, the owner should make a conscious effort to avoid placing the cost too low. He can make adjustments for an overcharge much more easily than he can replace a worn out machine with funds which he may not have because his rate is too low. Local current demands will determine wage rates to be assigned to the man operating the machine.

TABLE II.—Average Estimated Life, Yearly Use, and Repair Costs per Year for Machinery of Garfield County Farmers.

	Average Life (Years per Owner)	Average Hours Used per Year	Average Repair Costs per Year
Auto	6.1	*	
Truck	6.5	*	$54
Tractor	7.7	478	38
Combine	7.9	87	36
Tractor Plow	9.4	153	*
One Way	8.6	71	*
Disc	8.6	43	*
Lister	9.6	31	*
Harrow	12.0	102	*
Field Cultivator	13.5	84	*
Row Cultivator	12.3	40	*
Grain Drill	10.8	70	*
Thresher	9.2	84	*
Grain Binder	9.9	39	*
Mower	11.6	18	*
Hay Rake	9.3	24	*
Hay Baler	11.4	83	*
Row Binder	11.2	39	*
Silage Cutter	11.0	32	*

* Data not available.

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